1. How and why do the inner or terrestrial planets differ from the outer or Jovian planets?

The inner planets are smaller and denser than the outer planets because the Sun's gravitational attraction and the solar wind sorted the primitive planetary material into dense, compact matter that remained close to the Sun and less dense material that accreted in cooler regions away from the Sun.

2. What caused Earth to differentiate, and what was the result?

Differentiation of the Earth resulted from the joint effects of gravitational attraction and melting. As the primitive Earth was heated by impact, compression, and radioactive decay, its denser components were attracted toward the center and its less dense materials were displaced toward the surface. The result was the formation of a dense iron core surrounded by a less dense rock mantle and topped by a relatively light crust.

3. How does the chemical composition of Earth’s crust differ from that of its deeper interior? How does the chemical composition of Earth’s crust differ from that of its core?

Earth’s crust contains a greater variety of components than the deeper interior, and those components tend to be less dense. For example, iron makes up 35% of the whole Earth, only 6% of the crust, and iron makes up nearly the entire core.

4. What is global dimming? What has caused global dimming? How does global dimming affect the heat balance of the Earth? What might be the consequences of reversing global dimming?

Global dimming is the gradual reduction in the amount of global or total solar irradiance at the Earth's surface since the 1950s. The effect varies by location but worldwide it is of the order of a 5% reduction over the three decades 1960-1990; the trend has reversed during the past decade. Global dimming creates a cooling effect that may have led scientists to underestimate the effect of greenhouse gases on global warming. It is thought that the effect is probably due to the increased presence of aerosols and other particulates in the atmosphere. Experiments in the Maldives (comparing the atmosphere over the northern and southern islands) in the 1990s showed that macroscopic pollutants in the atmosphere at that time (blown south from India) caused a ~10% reduction in sunlight reaching the surface in the area under the pollution cloud. It is thought that the water droplets in clouds coalesce around these particles, resulting in the clouds consisting of a greater number of smaller droplets, which in turn makes them more reflective: bouncing more sunlight back into space. These effects of global dimming have masked the effect of global warming to some extent and that resolving global dimming may therefore lead to increases in future temperature rise. Global dimming may also have regional effects. While most of the earth has warmed, the regions that are downwind from major sources of air pollution (specifically sulfur dioxide emissions) have generally cooled. This may explain the cooling of the eastern United States relative to the warming western part.